Radiative and Resourcive Characteristics of Heterolasers on Varizonic Structure GaInAsP/In P Base

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The heterostructure of GaInAsP/InP with sharp and varizonic heteroboundary made by a liquid epitaxy method at different technologic regimes were obtained. The analysis of real state of heteroboundary structures was made by photoluminescent, electroluminescent, metalography and micro-X-ray spectral analysis methods. It was shown that on heteroboudary on side of epitaxial layer of indium phosphide forms the variable composition transitional layer the width of which depends from velocity of solution melting alloy cooling. Comparative studies of heterolasers radiative characteristics on base of sharp and varizonic structure GaInAsP/InP showed that by radiative characteristics the varizonic heterolasers do not yield for heterolasers on base of GaInAsP/InP structure. The threshold current densities were 3.5-7 kA/cm^2 and 3-7 kA/cm^2 in sharp and varizonic structures, respectively. The degradational process activation energy for heterolasers on base of GaInAsP/InP structure is 0.65 eV. These lasers passed through tests at 353 K temperature during 400-600 hours. Prognosis of work resources of studied heterolasers are (5.0-9.4) $\bullet 10^4$ and (7.4-13.3) $\bullet 10^4$ hours for samples from sharp and varisonic heterostructure, respectively.

The photoluminescence of thin films of InP and GaInAsP/InP was studied. The analysis of transitional layer influence on heteroboundary of GaInAsP/InP on radiative properties of these structures was carried out. The coherent photoluminescence in films at 77 K temperature was obtained.